

Penn Cambria Curriculum

Course Name	Informal Geometry
Length of Course	1 Credit, 5 Periods per week for 1 semester
Grade Level	10 th and 11 th
Prerequisites	Keystone Algebra One
Course Description	Informal Geometry is a basic level course in practical applications of geometry. The students will be exposed to geometry and geometric concepts with limited exposure to formal proofs.
Units of Study	Basics of Geometry Segments and Angles Parallel and Perpendicular Lines Triangle Relationships Congruent Triangles Quadrilaterals Similarity Polygons and Area Surface Area and Volume Circles Right Triangles
Materials	Text: Holt McDougal <u>Geometry: Concept and Skills</u> , c 2010 Supplemental Materials: Geometer's Sketchpad

Estimated times by day are provided. Times are adjusted based on student need. The additional ten days are used to adjust for re-teaching or enrichment, final review, final exam administration and days lost due to standardized assessment.

** Standards Alignment is based on PDE's revised draft standards dated January 2010 provided by the Standards Aligned System (www.pdesas.org). Keystone Assessment Anchor alignment is included at the end of the curriculum document.

Unit 1: Basics of Geometry

Estimated Time: 6 Days

Standard Alignment

- 2.2.11. C – Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values.
- 2.3.11. C – Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.5.11. A – Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
- 2.5.11. B – Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.
- 2.9.11. C – Use techniques from coordinate geometry to establish properties of lines, shapes, and solids.

Curricular Objectives:

A. Points, Lines, and Planes

- a. Name Points, Lines, and Planes
- b. Name Collinear and Coplanar Points
- c. Draw Lines, Segments, and Rays

B. Sketching Intersections

- a. Name Intersections of Lines
- b. Name Intersections of Planes
- c. Sketch Intersections of Lines and Planes

C. Segments and Their Measures

- a. Find the Distance Between Two Points
- b. Find a Distance by Adding and Subtracting
- c. Decide Whether Segments are Congruent

D. Angles and Their Measures

- a. Name Angles
- b. Measure Angles
- c. Classify Angles
- d. Add Angle Measures

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests
- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Unit 2: Segments and Angles

Estimated Time: 6 Days

Standard Alignment:

- 2.2.11. C - Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values.
- 2.3.11. C - Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.5.11. A - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
- 2.5.11. B - Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.
- 2.9.11. C - Use techniques from coordinate geometry to establish properties of lines, shapes, and solids.

Curricular Objectives:

A. Segment Bisectors

- a. Find Segment Lengths
- b. Use Algebra with Segment Lengths
- c. Use the Midpoint Formula

B. Angle Bisectors

- a. Find Angle Measures
- b. Find Angle Measures and Classify an Angle
- c. Use Angle Bisectors
- d. Use Algebra with Angle Measures

C. Complementary and Supplementary Angles

- a. Identify Complements and Supplements
- b. Identify Adjacent Angles
- c. Use Measures of Complements and Supplements
- d. Use a Theorem related to complimentary and supplementary angles

D. Vertical Angles

- a. Identify Vertical Angles and Linear Pairs
- b. Use the Linear Pair Postulate
- c. Use the Vertical Angles Theorem
- d. Find Angle Measures
- e. Use Algebra with Vertical Angles

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests
- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Unit 3: Parallel and Perpendicular Lines

Estimated Time: 8 Days

Standard Alignment:

- 2.2.11. C - Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values.
- 2.4.11. B – Use statements, converses, inverses and contra-positives to construct valid arguments or to validate arguments.
- 2.5.11. A - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
- 2.5.11. B - Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.
- 2.9.11. A – Create justifications for arguments related to geometric relations.

Curricular Objectives:

A. Relationships Between Lines

- a. Identify Parallel and Perpendicular Lines
- b. Identify Skew Lines
- c. Identify Relationships in Space

B. Theorems About Perpendicular Lines

- a. Perpendicular Lines and Reasoning
- b. Use Theorems about Perpendicular Lines
- c. Use Algebra with Perpendicular Lines

C. Angles Formed by Transversals

- a. Describe Angles Formed by Transversals
- b. Identify Angles Formed by Transversals

D. Parallel Lines and Transversals

- a. Find Measures of Corresponding Angles
- b. Find Measures of Alternate Interior Angles
- c. Find Measures of Alternate Exterior Angles
- d. Find Measures of Same-Side Interior Angles
- e. Use Algebra with Angle Relationships

E. Showing Lines are Parallel

- a. Write the Converse of an If-Then Statement
- b. Apply Corresponding Angles Converse
- c. Identify Parallel Lines
- d. Use Same-Side Interior Angles Converse

F. Using Perpendicular and Parallel Lines

- a. Construct Parallel Lines
- b. Use Properties of Parallel Lines
- c. Use Properties of Perpendicular Lines

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests

- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Unit 4: Triangle Relationships

Estimated Time: 9 Days

Standard Alignment:

- 2.3.11. C - Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.4.11. B - Use statements, converses, inverses and contra-positives to construct valid arguments or to validate arguments.
- 2.5.11. A - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
- 2.5.11. B - Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.
- 2.8.11. F - Interpret the results of solving equations, inequalities, systems of equations, and inequalities in the context of the situation that motivated the model.
- 2.9.11. A - Create justifications for arguments related to geometric relations.
- 2.10.11.A – Identify, create, and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem.

Curricular Objectives:

A. Classifying Triangles

- Classify Triangles by Sides
- Classify Triangles by Angles and Sides
- Identify the Parts of a Triangle

B. Angle Measures of Triangles

- Find an Angle Measure
- Use a Protractor

C. Isosceles and Equilateral Triangles

- Use the Base Angles Theorem
- Use the Converse of the Base Angles Theorem
- Find the Side Length of an Equiangular Triangle

D. The Pythagorean Theorem and the Distance Formula

- Find the Length of the Hypotenuse
- Find the Length of a Leg
- Find the Length of a Segment
- Use the Distance Formula

E. The Converse of the Pythagorean Theorem

- a. Verify a Right Triangle
- b. Classify triangles as acute, obtuse or right

F. Medians of a Triangle

- a. Draw a Median
- b. Use the Centroid of a Triangle

G. Triangles Inequalities

- a. Order Angle Measures
- b. Order Side Lengths
- c. Use the Triangle Inequality

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests
- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Unit 5: Congruent Triangles

Estimated Time: 7 Days

Standard Alignment:

- 2.4.11. A – Write formal proof's (direct proofs, indirect proofs/proofs by contradiction, use of counter-examples, truth tables, etc.) to validate conjectures or arguments.
- 2.4.11. B - Use statements, converses, inverses and contra-positives to construct valid arguments or to validate arguments.
- 2.5.11. A - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
- 2.5.11. B - Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.
- 2.9.11. B - Use arguments based on transformations to establish congruence or similarity of 2 dimensional shapes.

Curricular Objectives:**A. Congruence and Triangles**

- a. List Corresponding Parts
- b. Write a Congruence Statement
- c. Use Properties of Congruent Triangles
- d. Determine Whether Triangles are Congruent

B. Proving Triangles are Congruent: SSS and SAS

- a. Use the SSS Congruence Postulate
- b. Use the SAS Congruence Postulate
- c. Write a Proof for congruent triangles
- d. Prove Triangles are Congruent

C. Proving Triangles are Congruent: ASA and AAS

- a. Determine When to Use ASA Congruence
- b. Determine What Information is Missing
- c. Decide Whether Triangles are Congruent
- d. Prove Triangles are Congruent

D. Hypotenuse-Leg Congruence Theorem: HL

- a. Determine When to Use HL
- b. Use the HL Congruence Theorem
- c. Decide Whether Triangles are Congruent
- d. Prove Triangles are Congruent

E. Angle Bisectors and Perpendicular Bisectors

- a. Use the Angle Bisectors Theorem
- b. Use Perpendicular Bisectors
- c. Use the Perpendicular Bisector Theorem
- d. Use Intersecting Bisectors of a Triangle

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests
- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Unit 6: Quadrilaterals

Estimated Time: 8 Days

Standard Alignment:

- 2.2.11. C - Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values.
- 2.3.11. C - Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.4.11. B - Use statements, converses, inverses and contra-positives to construct valid arguments or to validate arguments.
- 2.5.11. B - Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.
- 2.9.11. A - Create justifications for arguments related to geometric relations.
- 2.9.11. B - Use arguments based on transformations to establish congruence or similarity of 2 dimensional shapes.

Curricular Objectives:

A. Polygons

- a. Identify Polygons
- b. Classify Polygons
- c. Find Angle Measures of Quadrilaterals

B. Properties of Parallelograms

- a. Find Side Lengths of Parallelograms
- b. Find Angles Measures of Parallelograms
- c. Find Segment Lengths

C. Showing Quadrilaterals are Parallelograms

- a. Use Opposite Sides
- b. Use Opposite Angles
- c. Use Consecutive Angles
- d. Use Diagonals

D. Rhombuses, Rectangles, and Squares

- a. Use Properties of Special Parallelograms
- b. Identify Special Quadrilaterals
- c. Use Diagonals of a Rhombus
- d. Use Diagonals of a Rectangle

E. Trapezoids

- a. Find Angle Measures of Trapezoids
- b. Midsegment of Trapezoid

F. Reasoning About Special Quadrilaterals

- a. Use Properties of Quadrilaterals
- b. Identify a Rhombus
- c. Identify a Trapezoid

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests
- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Unit 7: Similarity

Estimated Time: 7 Days

Standard Alignment:

- 2.9.11. A - Create justifications for arguments related to geometric relations.
- 2.9.11. B - Use arguments based on transformations to establish congruence or similarity of 2 dimensional shapes.
- 2.9.11. C – Use techniques from coordinate geometry to establish properties of lines, shapes, and solids.
- 2.3.11. C – Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.4.11. B - Use statements, converses, inverses and contra-positives to construct valid arguments or to validate arguments.
- 2.5.11. B - Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.

Curricular Objectives:**A. Ratio and Proportion**

- a. Simplify Ratios
- b. Solve a Proportion

B. Similar Polygons

- a. Use Similarity Statements
- b. Determine Whether Polygons are Similar
- c. Use Similar Polygons
- d. Find the Perimeters of Similar Polygons

C. Showing Triangles are Similar: AA

- a. Use the AA Similarity Postulate
- b. Use Similar Triangles

D. Showing Triangles are Similar: SSS and SAS

- a. Use the SSS Similarity Theorem
- b. Use the SAS Similarity Theorem
- c. Prove Similarity in Overlapping Triangles

E. Proportions and Similar Triangles

- a. Find Segment Lengths
- b. Determine Parallels
- c. Use the Midsegment Theorem

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests
- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Unit 8: Polygons and Area

Estimated Time: 9 days**Standard Alignment:**

- 2.2.11. C - Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values.
- 2.3.11. C - Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.3.11. E - Use properties of geometric figures and measurement formulas to solve for missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.5.11. B - Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.
- 2.9.11. B - Use arguments based on transformations to establish congruence or similarity of 2 dimensional shapes.
- 2.9.11. C - Use techniques from coordinate geometry to establish properties of lines, shapes, and solids.
- 2.10.11.A - Identify, create, and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem.

Curricular Objectives:**A. Classifying Polygons**

- Identify Convex and Concave Polygons
- Identify Regular Polygons

B. Angles in Polygons

- Use the Polygon Interior Angles Theorem
- Find the Measure of an Interior Angle
- Solve Equations involving Interior Angles of a Regular Polygons
- Find the Measure of an Exterior Angle

C. Area of Squares and Rectangles

- Find the Area of a Square
- Find the Area of a Rectangle
- Find the Height of a Rectangle
- Divide a Complex Polygon into Rectangles
- Find the Area of a Complex Polygon

D. Area of Triangles

- Find the Area of a Right Triangle
- Find the Area of a Triangle
- Find the Height of a Triangle
- Find Areas of Similar Triangles

E. Area of Parallelograms

- a. Find the Area of a Parallelogram
- b. Find the Height of a Parallelogram
- c. Find the Area of a Rhombus

F. Area of Trapezoids

- a. Find the Area of a Trapezoid
- b. Use the Area of a Trapezoid

G. Circumference and Area of Circles

- a. Find the Circumference of a Circle
- b. Find the Area of a Circle
- c. Use the Area of a Circle
- d. Find the Area of a Sector

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests
- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Unit 9: Surface Area and Volume
--

Estimated Time: 8 days

Standard Alignment:

- 2.2.11. C - Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values.
- 2.3.11. C - Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.3.11. E - Use properties of geometric figures and measurement formulas to solve for missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.5.11. A - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
- 2.9.11. A - Create justifications for arguments related to geometric relations.
- 2.9.11. B - Use arguments based on transformations to establish congruence or similarity of 2 dimensional shapes.
- 2.10.11.A - Identify, create, and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem.

Curricular Objectives:**A. Solid Figures**

- a. Identify and Name Polyhedra
- b. Find Faces and Edges

B. Surface Area of Prisms and Cylinders

- a. Use the Net of a Prism
- b. Find Surface Area of a Prism
- c. Find Surface Area of a Cylinder
- d. Find Lateral Area

C. Surface Area of Pyramids and Cones

- a. Find the Slant Height of a Pyramid and a Cone
- b. Find Surface Area of a Pyramid
- c. Find Surface Area of a Cone

D. Volume of Prisms and Cylinders

- a. Find the Volume of a Rectangular Prism
- b. Find the Volume of a Prism
- c. Compare Volumes of Cylinders

E. Volume of Pyramids and Cones

- a. Find the Volume of a Pyramid
- b. Find the Volume of a Cone

F. Surface Area and Volume of Spheres

- a. Find the Surface Area of a Sphere
- b. Find the Volume of Sphere

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests
- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Unit 10: Circles**Estimated Time: 7 Days****Standard Alignment:**

2.1.11. A – Model and compare values of irrational and complex numbers.

2.2.11. C - Evaluate numerical expressions that include the four basic operations and operations of powers and roots, reciprocals, opposites, and absolute values.

- 2.3.11. C - Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.5.11. A - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
- 2.5.11. B - Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.
- 2.9.11. A - Create justifications for arguments related to geometric relations.
- 2.8.11. F - Use combinations of symbols and numbers to create expressions, equations, and inequalities in two or more variables, systems of equations and inequalities, and functional relationships that model problem situations.

Curricular Objectives:

A. Parts of a Circle

- a. Identify Special Segments and Lines
- b. Name Special Segments, Lines, and Points
- c. Name Coordinates of Segments, Lines, and Points related to Circles

B. Properties of Tangents

- a. Use Properties of Tangents
- b. Find the Radius of a Circle
- c. Verify a Tangent to a Circle
- d. Use Properties of Tangents

C. Arcs and Central Angles

- a. Name and Find Measures of Arcs
- b. Find Measures of Arcs
- c. Find Arc Lengths

D. Arcs and Chords

- a. Find the Length of a Chord
- b. Find the Center of a Circle

E. Inscribed Angles and Polygons

- a. Find Measures of Inscribed Angles and Arcs
- b. Find Angle Measures of Inscribed Triangles and Quadrilaterals

F. Properties of Chords

- a. Find the Measure of an Angle formed by Arcs
- b. Find the Measure of an Arc
- c. Find Segment Lengths

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests
- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Unit 11: Right Triangles

Estimated Time: 5 days

Standard Alignment:

- 2.1.11. A - Model and compare values of irrational and complex numbers.
- 2.3.11. C - Use properties of geometric figures and measurement formulas to solve for a missing quantity (e.g., the measure of a specific angle created by parallel lines and a transversal).
- 2.5.11. A - Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense, and explain how the problem was solved in grade appropriate contexts.
- 2.5.11. B - Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas, and results.
- 2.9.11. A - Create justifications for arguments related to geometric relations.
- 2.10.11.A- Identify, create, and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem.

Curricular Objectives:

A. Simplifying Square Roots

- a. Use a Calculator to Find Square Roots
- b. Find Side Lengths of Right Triangles Using Pythagorean Theorem with Square Roots
- c. Multiply Radicals
- d. Simplify Radicals

B. 45°-45°-90°

- a. Find Hypotenuse Length
- b. Find Leg Lengths
- c. Identify 45°-45°-90° Triangles

C. 30°-60°-90°

- a. Find Leg Length
- b. Find Hypotenuse Length
- c. Find Longer Leg Length
- d. Find Short Leg Length

Assessments/ Measurement of Objectives:

- Problems / exercises
- Supplemental worksheets
- Class and/or homework activities
- Objective quizzes and tests
- Technology-based exercises

Suggested Methods of Instruction / Learning Activities:

- Direct Instruction
- In-Class Activities
- Problem solving exercises
- Technology-based exercises

Keystone Assessment Anchor Alignment – Geometry
--

UNIT 2: SEGMENTS AND ANGLES**Keystone Alignment:**

G.2.1.2.1 – Calculate the distance and/or midpoint between two points on a number line or on a coordinate plane.

G.2.2.1.1 – Use properties of angles formed by intersecting lines to find the measures of missing angles.

G.2.2.1.2 – Use properties of angles formed when two parallel lines are cut by a transversal to find the measures of missing angles.

UNIT 3: PARALLEL AND PERPENDICULAR LINES**Keystone Alignment:**

G.2.1.2.2 – Relate slope to perpendicularity and/or parallelism (limit to linear algebraic equations).

G.2.1.2.3 – Use slope, distance, and/or midpoint between two points on a coordinate plane to establish properties of a 2-dimensional shape.

G.2.1.3.1 – Apply the concept of the slope of a line to solve problems.

G.2.2.1.2 – Use properties of angles formed when two parallel lines are cut by a transversal to find the measures of missing angles.

UNIT 4: TRIANGLE RELATIONSHIPS**Keystone Alignment:**

G.1.2.1.1 – Identify and/or use properties of triangles.

G.1.2.1.3 – Identify and/or use properties of isosceles and equilateral triangles.

G.1.3.1.1 – Identify and/or use properties of congruent and similar polygons or solids.

G.1.3.1.2 – Identify and/or use proportional relationships in similar figures.

G.2.2.2.2 – Find the measurement of a missing length, given the perimeter, circumference, or area.

G.2.1.1.1 – Use the Pythagorean Theorem to write and/or solve problems involving right triangles.

UNIT 5: CONGRUENT TRIANGLES**Keystone Alignment:**

G.1.2.1.1 - Identify and/or use properties of triangles.

G.1.2.1.3 – Identify and/or properties of isosceles and equilateral triangles.

G.1.3.1.1 - Identify and/or use properties of congruent and similar polygons or solids.

G.1.3.1.2 - Identify and/or use proportional relationships in similar figures.

G.1.3.2.1 – Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/ proofs by contradiction).

UNIT 6: QUADRILATERALS**Keystone Alignment:**

G.1.2.1.1 – Identify and/or use properties of triangles.

G.1.2.1.2 – Identify and/or use properties of quadrilaterals.

G.1.2.1.3 - Identify and/or properties of isosceles and equilateral triangles.

G.1.2.1.4 – Identify and/or use properties of regular polygons.

G.2.2.1.1 - Use properties of angles formed by intersecting lines to find the measures of missing angles.

UNIT 7: SIMILARITY**Keystone Alignment:**

G.1.2.1.1 – Identify and/or use properties of triangles.

G.2.2.1.2 – Use properties of angles formed when two parallel lines are cut by a transversal to find the measures of missing angles.

G.1.3.1.1 – Identify and/or use properties of congruent and similar polygons or solids.

G.1.3.1.2 – Identify and/or use proportional relationships in similar figures.

UNIT 8: POLYGONS AND AREA

Keystone Alignment:

- G.2.2.2.1 – Estimate area, perimeter, or circumference of an irregular figure.
- G.2.2.2.2 – Find the measurement of a missing length, given the perimeter, circumference or area.
- G.2.2.2.5 – Find the area of a sector of a circle.

UNIT 9: SURFACE AREA AND VOLUME

Keystone Alignment:

- G.1.2.1.5 – Identify and/or use properties of pyramids and prisms.
- G.2.3.1.1 – Calculate the surface area of prisms, cylinders, cones, pyramids, and/or spheres. Formulas are provided on a reference sheet.
- G.2.3.1.2 – Calculate the volume of prisms, cylinders, cones, pyramids, and/or spheres. Formulas are provided on a reference sheet.
- G.2.3.1.3 – Find the measurement of a missing length, given the surface area or volume.
- G.2.3.2.1 – Describe how a change in the linear dimension of a figure affects its surface area or volume (e.g., How does changing the length of the edge of a cube affect the volume of the cube?).

UNIT 10: CIRCLES

Keystone Alignment:

- G.1.1.1.1 – Identify, determine and/or use the radius, diameter, segment, and/or tangent of a circle.
- G.1.1.1.2 – Identify, determine, and/or use the arcs, semicircles, sectors, and/or angles of a circle.
- G.1.1.1.3 – Use chords, tangents, and secants to find missing arc measures or missing segment measures.
- G.1.1.1.4 – Identify and/or use the properties of a sphere or cylinder.

UNIT 11: RIGHT TRIANGLES

Keystone Alignment:

- G.2.1.1.1 – Use the Pythagorean theorem to write and/or solve problems involving right triangles.

KEYSTONE GEOMETRY Assessment Anchors That Still Need To Be Integrated

Changes and adjustments to curriculum to include these anchors will be necessary as PDE provides updated information and guidance regarding Keystone Assessments and the PA Common Core Standards. However, given current changes and resulting transitions in math curriculum, this document reflects the current curriculum

- G.2.1.1.2 – Use trigonometric ratios to write and/or solve problems involving right triangles.
- G.2.1.4.1 – Solve or graph systems of equations or systems of inequalities within a problem situation using coordinate geometry.
- G.2.2.2.3 – Find the side length of a polygon with a given perimeter to maximize the area of the polygon.
- G.2.2.2.4 – Develop and/or use strategies to estimate the area of a compound/composite figure.
- G.2.2.3.1 – Describe how a change in the linear dimension of a figure affects its perimeter, circumference, and area (e.g., How does changing the length of the radius of a circle affect the circumference of the circle?)
- G.2.2.4.1 – Use area models to find probabilities.